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PCT / IB 02 / 03793

27 SEP 2002

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DEPARTMENT OF TRADE  
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the documents annexed hereto are true copies of:

Application form P.1, provisional specification and drawings  
of South African Patent Application No. 2002/3149 as originally  
filed in the Republic of South Africa on 22 April 2002 in the  
name of VON SEIDEL MICHAEL for an invention entitled:  
"A METHOD AND SPOOL FOR SHORTENING ELONGATE  
FLEXIBLE TENSION MEMBERS".

Geteken te  
Signed at

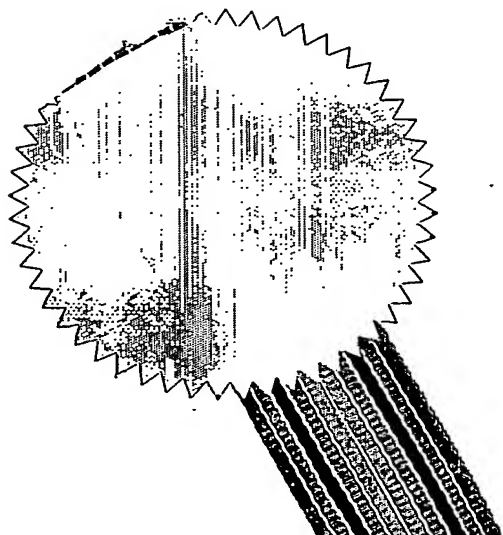
PRETORIA

in die Republiek van Suid-Afrika, hierdie  
in the Republic of South Africa, this

3rd

dag van  
day of

September 2002



*[Signature]*  
Registrateur van Patente  
Registrar of Patents

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FORM P1

REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

## APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF RECEIPT

(Section 30(1) - Regulation 39)

The grant of a Patent is hereby requested by the undermentioned applicant(s)  
on the present application filed in duplicate



21 01 Official Application No.  
**2002/3149**

22 Lodging Date  
**22 APR 2002**

REGISTRAR VAN PATENTE, MODELLE,  
HANDELSMERKE EN OUTEURSREG  
**P0067**

71 Full name(s) of applicant(s)  
**VON SEIDEL, Michael**

Address(es) of applicant(s)

**10 LECCINO TERRACE, BAKKERSHOOGTE, SOMERSET WEST  
WESTERN CAPE PROVINCE, 7130 SOUTH AFRICA**

54 Title of invention  
**A METHOD AND SPOOL FOR SHORTENING ELONGATE FLEXIBLE TENSION MEMBERS**

The applicant claims priority as set out in the accompanying form P2

The earliest priority is

This application is for a Patent of Addition to Patent (Application) No.

This application is a fresh application in terms of S 37 and based on Application No.

21	01	
21	01	

This application is accompanied by:-

- |                                     |     |   |                                  |
|-------------------------------------|-----|---|----------------------------------|
| <input checked="" type="checkbox"/> | 1a  | A single copy of a provisional specification of                           | 14 pages                         |
|                                     | 1b  | Two copies of a complete specification of                                 | pages                            |
|                                     | 2a  | Informal drawings of  | Nil sheets                       |
| <input checked="" type="checkbox"/> | 2b  | Formal drawings of  | 4 sheets                         |
|                                     | 3   | Publication particulars and abstract (form P8 in duplicate)               |                                  |
|                                     | 4   | A copy of Figure  | of the drawings for the abstract |
|                                     | 5   | Assignment of invention (from the inventor(s)) or other evidence of title |                                  |
|                                     | 6   | Certified priority documents (  | documents)                       |
|                                     | 7   | Translation of priority documents (                                       | documents)                       |
|                                     | 8   | Assignment of priority rights   |                                  |
|                                     | 9   | A copy of form P2 and the specification of S.A. Patent Application No.    |                                  |
| <input checked="" type="checkbox"/> | 10  | A declaration and power of attorney on form P3                            |                                  |
|                                     | 11  | Request for ante-dating on form P4  |                                  |
|                                     | 12  | Request for classification on form P9                                     |                                  |
|                                     | 13a | Request for delay of acceptance on form P4                                |                                  |
|                                     | 13b |   |                                  |

21	01	
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74 Address for Service:

**Michael von Seidel, 10 Leccino Terrace, Bakkershoogte, Somerset West  
Western Cape Province, 7130 South Africa**

Date **18th April 2002**

applicant

The duplicate will be returned to the applicant's address for service  
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REGISTRAR OF PATENTS, DESIGNS,  
TRADE MARKS AND COPYRIGHT

**2002-04-22**

REGISTRAR VAN PATENTE, MODELLE,  
HANDELSMERKE EN OUTEURSREG

FORM P6

REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

PROVISIONAL SPECIFICATION

Section 30 (1) — Regulation 27

21

01

Official application No.

2002/3149

22

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22 APR 2002

71

Full name(s) of applicant(s)

VON SEIDEL, Michael

72

Full name(s) of inventor(s)

VON SEIDEL, Michael

54

Title of invention

A METHOD AND SPOOL FOR SHORTENING ELONGATE FLEXIBLE TENSION MEMBERS

## A METHOD AND SPOOL FOR SHORTENING ELONGATE FLEXIBLE TENSION MEMBERS

5

### FIELD OF THE INVENTION

This invention relates to a method and spool for shortening the effective length of elongate flexible tension members and, more particularly, but not  
10 exclusively, tension members in the form of wires, generally multistrand wires, or cords used for suspending pictures and other decorative items from a suspension point, typically a hook or nail fixed to a wall.

Still more particularly, but not exclusively, the invention relates to a spool that  
15 can be used for shortening wires or cords suspending pictures with a view to adjusting the height of the picture relative to a wall against which it is suspended.

In spite of the fact that the main thrust of this specification will be directed at  
20 wires and cords used for suspending pictures, the principles and scope of the invention extend to other applications such as the shortening of guy ropes in order to the tighten them, for example.

### BACKGROUND TO THE INVENTION

25

It is generally-desirable that particular pictures be suspended against a wall or the like at a particular height that is most appropriate to the picture; its location and surroundings; and most of all, the aesthetic requirements of the persons concerned. It is particularly desirable that the height of certain  
30 pictures relative to other pictures, for example pictures arranged in a predetermined pattern, be correct in order to achieve the desired objectives of the composite display.

Attaching a wire or cord to attachment points, typically eyes having a screw threaded shank anchored in a picture frame or otherwise secured to such picture frame, such that the wire or cord is of exactly the desired length to result in the picture hanging at a required height, has long been a problem.

5

To tie, untie, and re-tie one or other end of such a wire or cord is tedious; may have to be repeated a number of times; and in any event does not easily result in the wire or cord being of exactly the required length.

10 As a result, numerous different proposals have been put forward with a view to providing other means for adjusting the effective length of such picture wire or cord in a manner that is easier and, in particular, more accurate without tying and retying the wire or cord. The various means of which applicant is aware can be classified broadly into different types.

15

One type of which US patents 3,330,525 and 3,945,599 are typical seeks to provide a series of different formations from which a picture can be suspended, the use of each different formation resulting in the picture hanging at a different height. The use of this type of device does not affect  
20 the length of the picture wire or cord itself.

20

A second type of which US patents 696,510; 769,695; and 862,011 are examples seeks to wind at least one end portion of the picture wire or cord onto a reel that is stopped in the required position by means of a ratchet of  
25 some type or another. The axis of the reel is at generally right angles to the picture wire or cord, in the normal way. . . .

25

A third type seeks to create an adjustable deviation to the natural straight condition of a portion of the length of the wire or cord so as to shorten the  
30 effective length thereof. US patents 4,566,665 and 3,251,569 and international patent application WO 9616580 achieve this using a screw thread and nut in combination with a pair of spaced guides so that the wire or

30

cord follows a generally U-shaped path with the depth of the U varying according to the position of the nut along the length of the screw thread. This varies the effective length of the wire or cord.

- 5 US patent 5,695,147 is also of this general type and has a guide rotatable in unison with a ratchet for creating a variable degree of zigzag in the length of the picture wire or cord to shorten it to different extents.

- 10 Yet another different type is set forth in European patent application number EP 1088502 in which at least one end region of the wire or cord is engaged by a dog of a fitting associated with the picture frame so that the dog can be engaged with the wire or cord at any position along its length to vary the effective length of the wire or cord.

- 15 All of the above involve the use of relatively expensive and complicated gadgets. Also, most of them, require removal of the picture from its suspended position and the attachment of the relevant device to the picture, usually to its frame. This is relatively costly in time and effort apart from the cost of the device itself. It is often physically inconvenient or even difficult to  
20 remove a picture from a position in which hangs in order to apply such a device; damage to the picture can occur consequent on the necessary manhandling thereof; and the picture must be re-hung on the wall.

- The prior art devices indicated above also, as a general rule, are not suitable  
25 for adjusting the position of the picture wire or cord with the weight of the picture exerted on the wire or cord. Also, at least many of them do not lend themselves to making rather small adjustments to the length of the wire or cord which, as a result of the geometry of the usual arrangement, are necessary, as a small adjustment in length of the wire or cord often gives rise  
30 to a greater adjustment in height of the picture.

The only other expedient of which applicant is aware is that set out in US patent 4,364,538 that proposes a system of adjustable loops in a single or double picture wire or cord. This expedient, applicant believes, is also fairly costly; is wasteful of wire or cord; is difficult for an untrained person to install on a picture; and is also difficult to adjust, particularly with the full or most of the weight of the picture being supported by the wire or cord.

### OBJECT OF THE INVENTION

It is, accordingly, an object of this invention to provide a method and a spool for use in the method whereby at least some of the disadvantages associated with the prior art devices referred to above are obviated.

### SUMMARY OF THE INVENTION

In accordance with one aspect of the invention there is provided a spool for shortening the length of an elongate flexible tension member, the spool comprising an elongate shank having associated with each end thereof a transverse retainer formation adapted operatively to prevent unravelling off the shank of a flexible tension member passing around the elongate shank with the axis of the shank extending in the same general direction as the flexible tension member; a keeper formation for cooperation with an elongate flexible tension member to enable it to be wound onto the shank by rotation thereof; and a manually operable handle for rotating the shank about its own axis.

Further features of the invention provide for the retainer formation at one end of the shank to form also the keeper formation; for the retainer formation at the other end of the shank to be formed, at least in part, by the manually operable handle; and for additional holding means to be provided for releasably engaging a cooperant wire or cord to prevent unravelling thereof

off the shank under conditions in which tension is removed from the wire or cord.

5 In one preferred form of the invention the spool is formed from a suitable gauge of wire that is bent to form a shank in the middle; a combination retainer formation and keeper formation at one end; and a combination retainer formation and manually operable handle at the other end. In that case the wire can also be bent and optionally stamped to form said additional holding means for releasable engagement with a cooperating elongate flexible tension member. Alternatively, the additional holding means could be  
10 formed as part of a separate element for attachment to the handle of the spool.

15 In an alternative form of the invention the keeper means is a slot extending axially inwards from the end of the shank remote from the handle.

In accordance with a second aspect of the invention there is provided a method of shortening an elongate flexible tension member comprising the steps of associating the keeper means of a spool as defined above with the  
20 elongate flexible tension member; rotating the shank about its own axis by means of the handle with the shank extending transverse to the elongate flexible tension member so as to wind the tension member around the shank to a required extent; and releasing the handle such that the shank extends in the same general direction as the elongate tension member and the retainer  
25 means at each end serves to prevent unravelling of the elongate flexible tension member from the shank.

Further features of this aspect of the invention provide for the spool to be manipulated such that the shank extends at an incline to the elongate flexible  
30 tension member at least during initial rotation of the shank to initiate winding of the tension member around the shank; and, in the case that additional



holding means are provided, to engage such holding means with the elongate flexible tension member to releasably attach same to the spool.

In order that the above and other features of the invention may be more fully understood various different embodiments thereof will now be described with reference the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

10 In the drawings:-

Figure 1 is an isometric view of one embodiment of spool according to the invention;

15 Figure 2 is an elevation thereof;

Figure 3 is an end view from the handle end of the spool;

Figure 4 is an end view from the opposite end of the spool;

20

Figure 5 is an end view similar to Figure 3 but illustrating a variation in which a stamping operation has been performed in order to modify the additional holding means that are integral with the spool illustrated in Figures 1 to 4;

25

Figure 6 is an elevation of a variation of the embodiment illustrated in Figures 1 to 4 simplified by the omission of any additional holding means;

30

Figure 7 is a rear view of a picture having a picture wire or cord fitted in conventional manner and illustrating a spool according to the invention in an operative position;

Figure 8 is an elevation illustrating the first step in installing a spool of the type illustrated in Figures 1 to 4 on the picture wire or cord whilst the picture is in its operative suspended condition;

5

Figure 9 illustrates the spool in a final position in which the length of the wire or cord is shortened by a very small amount;

10

Figure 10 is a similar illustration showing the spool shortening the wire or cord by a slightly greater amount;

Figure 11 is a similar illustration but showing the spool being used to shorten the wire or cord by a considerably greater amount;

15

Figure 12 is a similar illustration but showing the simplified embodiment of Figure 6 in an operative position;

20

Figure 13 is an isometric view of a further variation of the embodiment of the invention illustrated in Figures 1 to 4 a variation being particularly useful for fitment to a picture as original equipment at the time when the picture wire or cord is initially installed thereon;

25

Figure 14 is an elevation of a plastics injection moulded spool according to the invention;

Figure 15 is a cross-section taken along line XV to XV in Figure 14;

30

Figure 16 is an elevation of the embodiment of the invention illustrated in Figure 6 fitted with a separate part that defines additional holding means;

Figure 17 is an elevation of an alternative embodiment of the invention formed of wire; and,

5 Figure 18 is an elevation of an embodiment of the invention suitable for use in tensioning guy ropes or other somewhat larger scale elongate flexible tension members.

### DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

10 In the embodiment of the invention illustrated in Figures 1 to 4 a spool, generally indicated by numeral (1), is made for the purpose of shortening picture wires or cords and is formed from bent wire. The diameter of the wire is chosen according to requirements and it is envisaged that spools according to the invention may be made in different sizes for application to  
15 different size ranges of pictures and, more particularly, different thicknesses of wires and cords. In this particular embodiment of the invention the spool is aimed at a rather middle of the range thickness of wire or cord and for this purpose a steel wire of about 3 mm in diameter for production of the spool has been found to operate satisfactorily.

20 The spool has a straight shank (2) the length of which can be chosen according to requirements and which is not be too short as that may make it difficult to use and may also detract from the ability to shorten a wire or cord by only a rather small amount as will become apparent from the following. A  
25 length of the shank of about 30 to 35 mm has been found to be effective although a longer shank will enable a more accurate shortening of the wire or cord to be made it will be correspondingly more expensive. Doubtless, experience will assist in enabling a substantially ideal length to be determined bearing in mind both cost and efficacy.

30 The wire at one end of the shank is bent radially outwards and thence into a generally radially inwardly projecting U-shaped formation as indicated by

numeral (3). The web (4) of the U-shape is thus offset from the axis of the shank. The U-shaped formation forms a combination of both the transverse retainer formation of one end of the shank and the keeper formation in this embodiment of the invention.

5

The wire at the opposite end of the shank is bent radially outwards and thence into a diametrically extending rectangular handle (5) whereby the shank can be rotated about its own axis. The diametrical dimension of the handle can be, for example, of the order of 40 mm as that will provide a substantial mechanical advantage for winding a wire or cord onto the shank when substantially the full weight of a picture is supported by the wire or cord.

10

The wire is further bent to form an inner rectangular convolution (6) that is contained in a plane angularly offset from that of the handle to provide convergent gaps (7) (see Figures 3 and 4) that define additional holding means of the nature defined above. The wire or cord can be wedged releasably into these gaps to hold it in association with the spool, for example when a picture is removed from its hanging position and tension in the wire or cord is totally released.

15

20

As illustrated in Figure 5, the inner rectangular convolution could be subjected to a stamping operation in order to offset the two wings (8) and to form convergent gaps (9) having a smaller angle that conform more to a locking wedge configuration.

25

Figure 6 illustrates an embodiment of the invention, generally indicated by numeral (10), that is similar to the one illustrated in Figures 1 to 4 but with the additional holding means (the inner convolution) totally omitted.

30

Referring now to Figures 7 to 11 of the drawings, the spool described above may be used on a wire or cord (11) that is installed in the usual way on a

picture (12) by attaching the two ends (13) of the cord to fasteners (14) fixed to the picture frame. It will be understood that by shortening the effective length of the wire or cord between the fasteners the height at which the picture hangs will be adjusted.

5

With the picture in its operative position (the spool can also be installed before the picture is hung on the wall) the one side of the picture can simply be pulled away slightly from the wall and the spool manipulated so that the wire or cord is located in the U-shaped formation with the shank (2) extending at an incline to the wire or cord. Rotation of the shank using the handle (5) in the appropriate direction, in this case in clockwise direction when viewed from the handle end of the spool, will cause the wire or cord to become wound around the shank.

10

Depending on how much adjustment is needed, only a single revolution or even a half a revolution can be employed in which case the wire or cord can assume an extremely long pitch helix around the shank as shown in Figure 9. This has the effect of shortening the wire or cord by only a very small amount that will adjust the height of the picture by an amount that will ultimately depend on the angle that the wire or cord makes with the horizontal. In a fairly conventional situation and with the dimensions of the spool described above an adjustment in height of the picture of two mm can generally easily be achieved and possibly even less depending on circumstances. If a greater degree of adjustment is necessary more wire or cord should be wound onto the shank to result in a situation that is illustrated in Figures 10 and 11.

20

25

In any event, once adequate wire or cord has been wound onto the shank, the handle is moved towards the adjacent portion of the wire or cord and the wire or cord can be engaged in the gap (7) as may be required.

30

Of course, in the case of the simple embodiment of the invention illustrated in Figure 6, and as illustrated in Figure 12, the wire or cord can simply be allowed to rest against the handle. It will be understood that the tension in the wire or cord will hold it in this position positively so long as tension exists.

- 5 The additional holding means is thus not an essential part of the invention in any way.

Initiating the winding of the wire or cord onto the shank needs to be performed with at least some care to ensure that winding actually commences. Whilst a simple U-shaped formation at right angles to the axis of the shank can be made to operate effectively, it has been found that an improvement can be achieved by forming a U-shaped formation (15) (see Figure 6) that conforms to a part of a helical convolution extending back over the shank (16).

15

Of course all difficulty in this regard can be obviated by employing the embodiment of the invention illustrated in Figure 13 in which the U-shaped formation is replaced by a closed eyelet (17) offset to one side of the shank and through which the wire or cord must be threaded at the time that it is attached to the picture frame in the first place. Alternatively one end of the wire or cord must be released and a threaded through the eye in order to install an embodiment of this general nature.

20

Turning now to the embodiment of the invention illustrated in Figures 14 and 15 a spool, generally indicated by numeral (18) is made of injection moulded plastics material and has a flat configuration with a shank (19) that has a slot (20) entering from one end and an integral handle (21) at the opposite end. A laterally extending retainer formation (22) extends arcuately outwards from each side of the slotted end of the shank and the opposing edges (23) of the handle are arcuately shaped complementarily. The arcuate shapes assist in guiding the wire or cord into engagement with the relevant component when

30

the spool is moved to its orientation in which the shank extends in the same general direction as the wire or cord.

5 In this embodiment of the invention a pair of integral clips (24) are formed in the handle with one being accessible from each side of the handle. These clips are shaped such that a wire or cord can be engaged underneath them to retain the wire or cord releasably in association with the handle. The clips thus serve as the additional holding means defined above.

10 In use, the spool of this embodiment of the invention is associated with a wire or cord by moving the spool such that the wire or cord is received in the slot and rotation of the spool about the axis of the shank will cause the wire or cord to wind onto the shank.. The spool, for the remainder, functions as described above.

15 Figure 16 illustrates an embodiment of the type illustrated in Figure 6 but having a separately made spring steel part (25) fixed to it. This part (25) may be pressed from sheet metal to form a pair of oppositely directed clips (26) substantially the same as those illustrated in Figure 15 to serve as the  
20 additional holding means.

Figure 17 illustrates an embodiment of the invention similar in outer form to that illustrated in Figure 14 but formed of wire two passes of which are twisted together to form the major part of the length of the shank (27) and  
25 wherein the two passes extend for a short distance in parallel spaced relationship to define a slot (28) at the end opposite the handle (29). The two free ends (30) of the length of wire are bent outwards to form a pair of oppositely directed retainer formations.

30 Figure 18 illustrates a physically much larger embodiment of the invention in which a metal rod is bent to substantially the shape of the embodiment of Figure 6 apart from the fact that the handle is formed into a crank (31) having

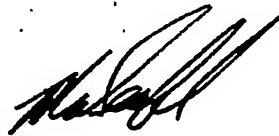
one limb (32) parallel to the shank (33) and laterally offset to one side thereof and a diametrically opposite and parallel limb (34) axially offset on the other side of the shank. The resultant crank formation can thus be rotated by two hands of a person in a manner in well known to those skilled in the art. This  
5 embodiment of the invention is aimed at shortening and therefore tightening guy ropes or other larger flexible elongate tension members.

Numerous other embodiments are possible within the scope hereof without departing from the spirit of the invention which relies primarily on the fact that  
10 the axis of the spool in the operative position extends in the same general direction as the elongate flexible tension member wound thereon.

Finally, it is to be noted that, as in the case of many of the prior art device is, application of the invention relies on the relevant elongate flexible tension  
15 member being sufficiently long in the first place so that its effective length can be adjusted by shortening it.

Dated this 18th day of April 2002.

20



applicant



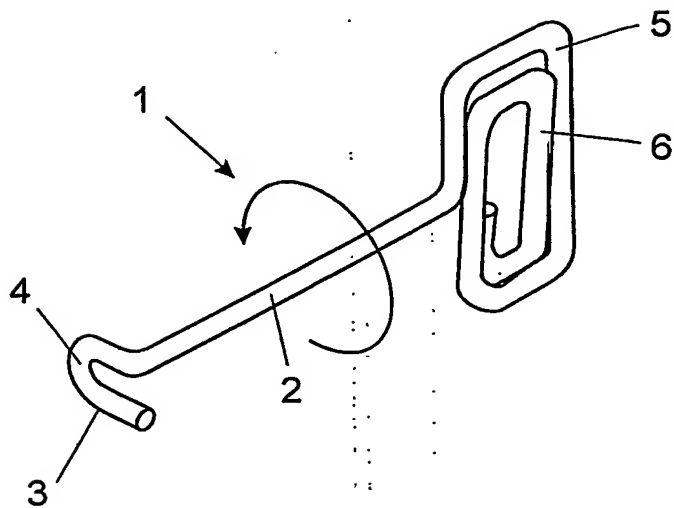


Figure 1

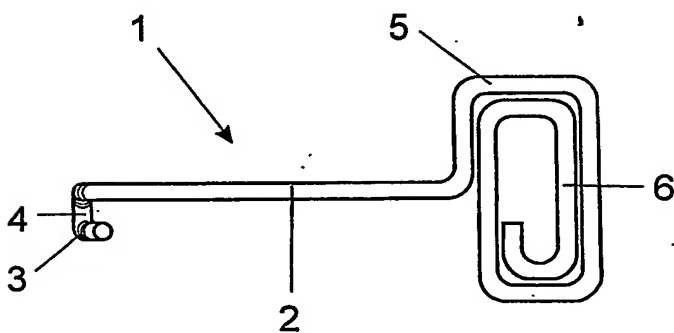


Figure 2

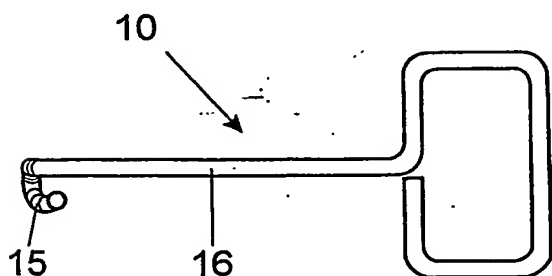


Figure 6

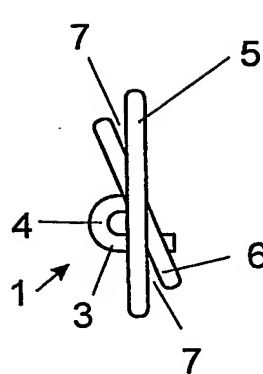


Figure 3

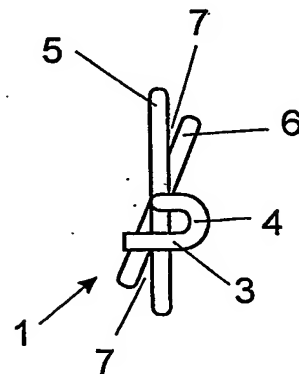


Figure 4

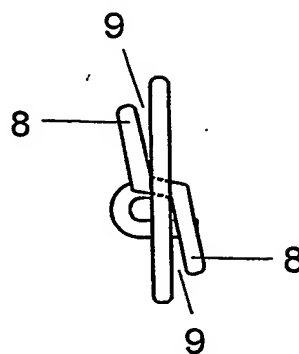


Figure 5

*[Signature]*  
applicant

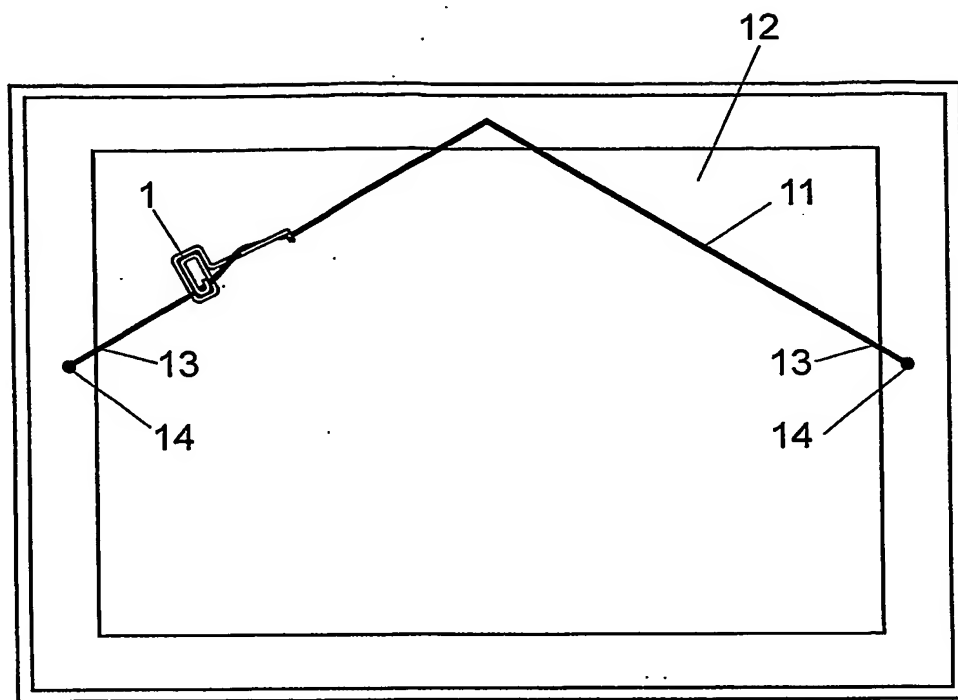


Figure 7

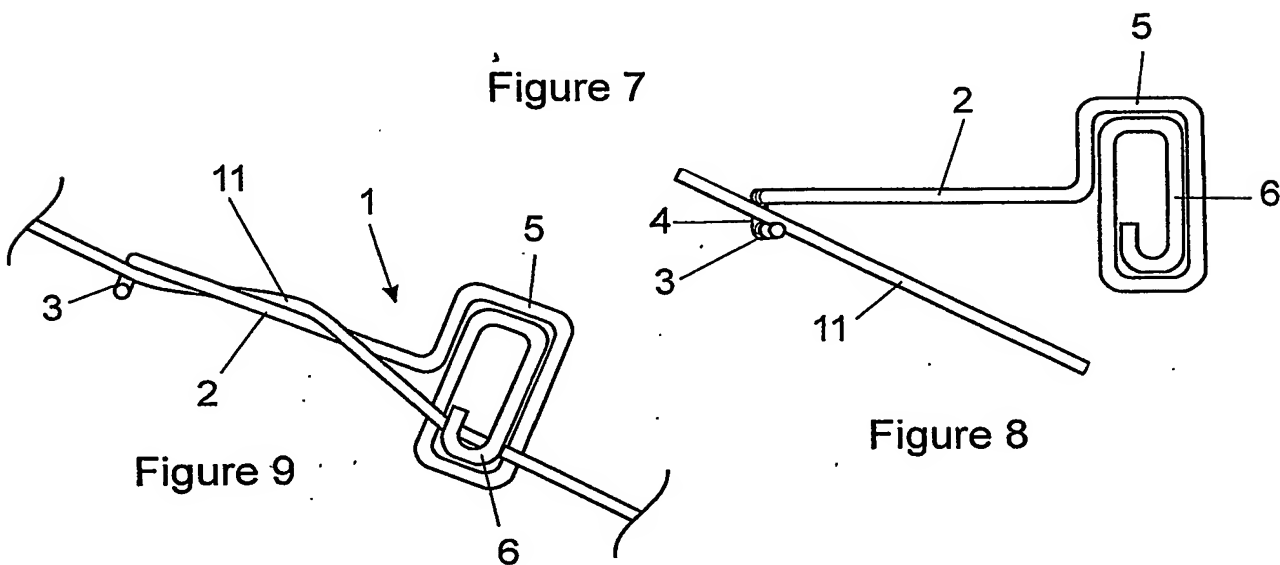


Figure 9

Figure 8

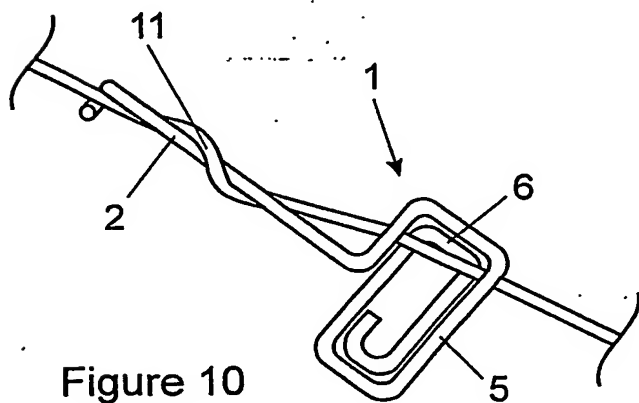


Figure 10

*Michael von Seidel*  
applicant

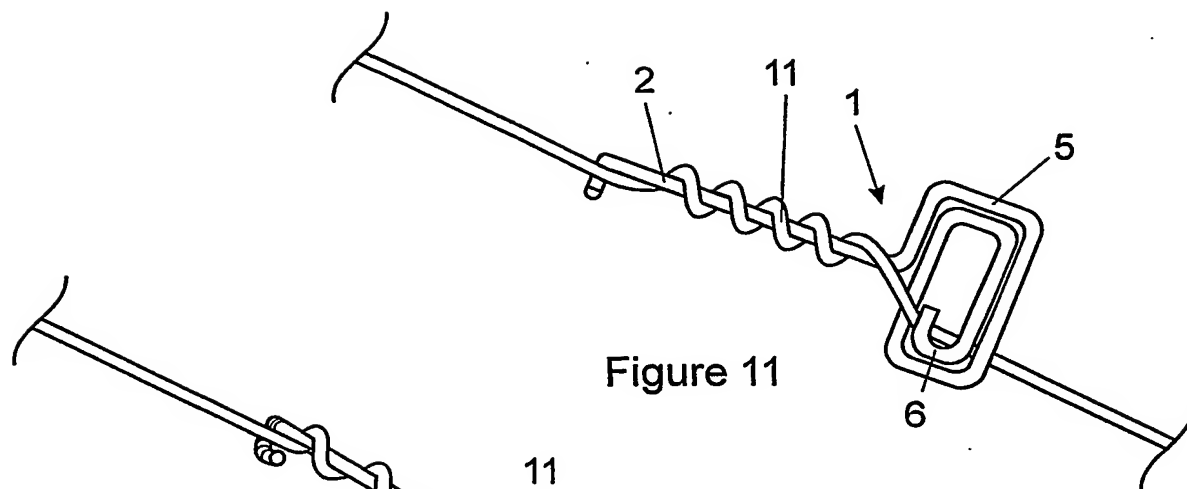


Figure 11

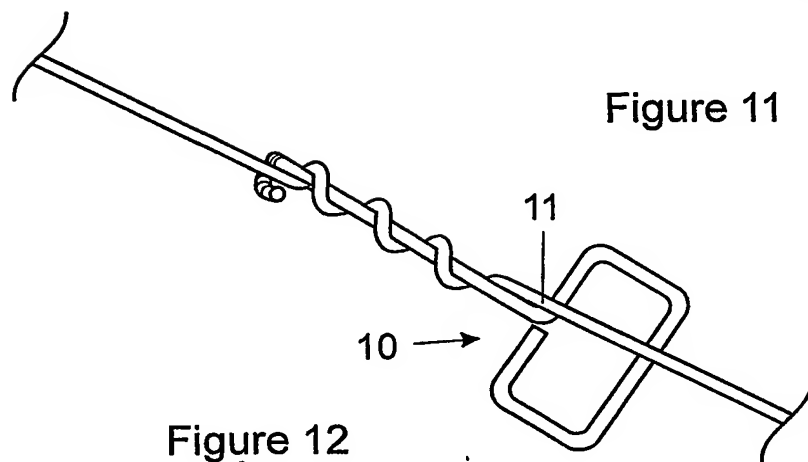


Figure 12

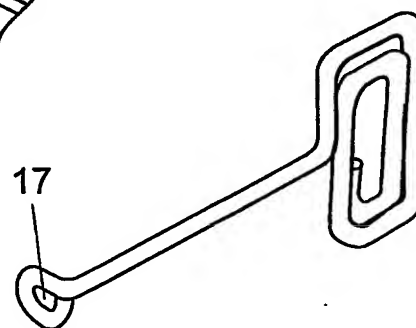


Figure 13

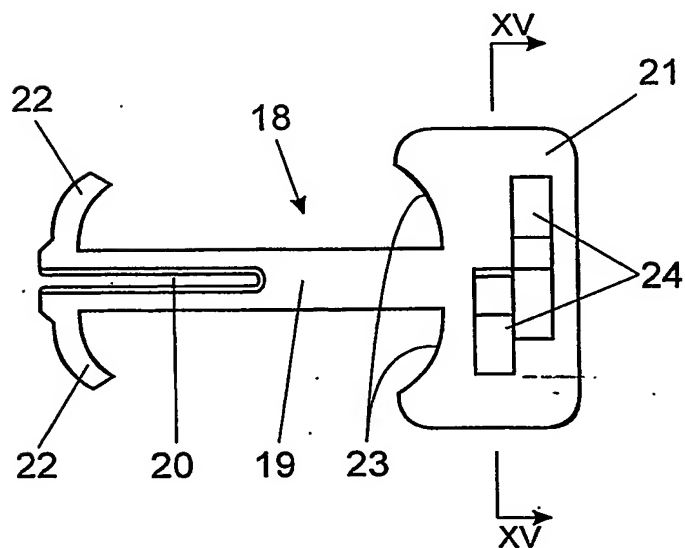
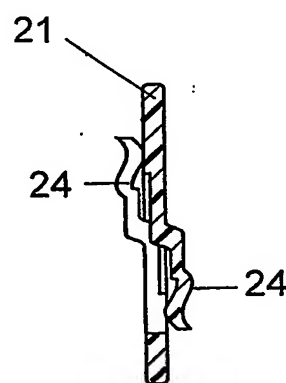


Figure 14



**Figure 15**

applicant

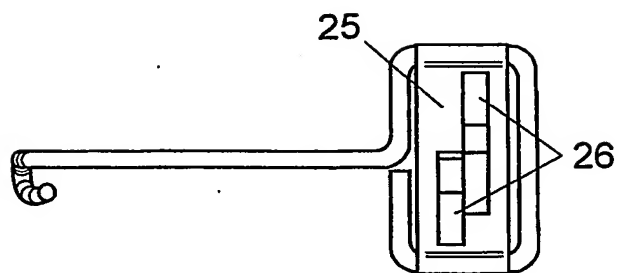


Figure 16

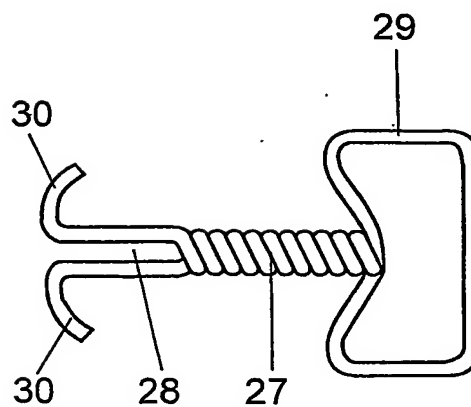


Figure 17

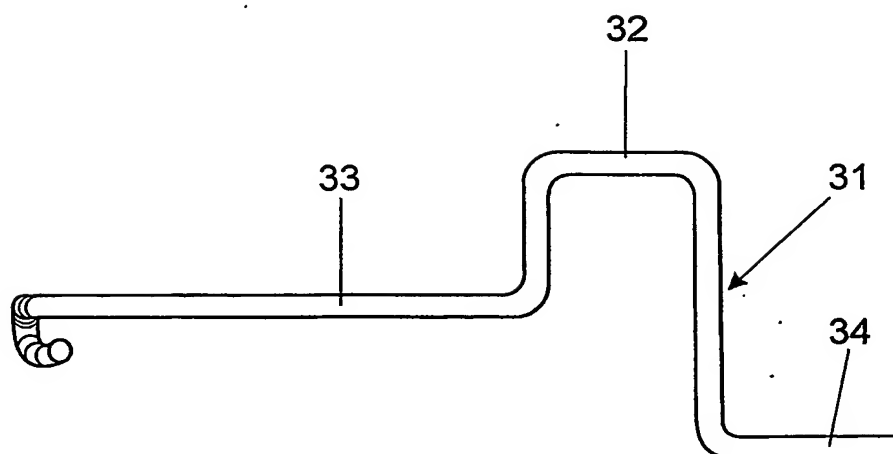


Figure 18

applicant